



Briefing Paper

Why inventory is critical to network autonomy

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Artificial Intelligence has changed the world. But AI is only as good as the data that it is fed. Some software vendors claim that the introduction of AI into operations support systems (OSS) as part of a next-gen, digital transformation makes performing the traditional network inventory obsolete. However, AI operations cannot function properly by solely relying on ad hoc discovered, unstructured operational data stored, e.g. a data lake. In other words, fragmented and unverified data cannot create a sound foundation for AI's predictive networks.

There is an undeniable trend for telecoms to automate their networks. As the core of the telecom network, the OSS designs, monitors and optimizes the entire network infrastructure and the services running over it. Automating the OSS allows the telecom to achieve greater operational efficiency, reduce human error and enable faster response to network changes.

Additionally, automation results in improved network performance and reliability, faster service provisioning and configuration, and progress toward autonomous networks that can self-optimize and self-heal. The long-term goal is to develop Level 4 autonomous networks, which require sophisticated inventory management, AI-driven operations, and intelligent decision-making capabilities.



Garbage in, garbage out

With the influx of AI into the technology marketplace, there have been exaggerated claims concerning what network automation can be accomplished with artificial intelligence. Some vendors claim that they can use AI to skip the step of doing an inventory in the process of automating the OSS. They claim the network behavior, topology and assets can be reconstructed simply by looking at operational data to improve network efficiency.

While existing data is critical to developing autonomous networks, disparate systems create inconsistent and fragmented data, and a lack of data governance and data processing create additional inefficiencies. Simply put, every

computer is only as good as the data that it relies on. The old adage — garbage in, garbage out — is still true.

In dynamic, AI-driven, predictive operations, fragmented data architectures may result in delayed incident resolution, inconsistent understanding of customer impact, and excessive reliance on manual or policy-driven processes. In short, limited AI automation.

As with a human network expert, an AI tool, as well, needs a reliable and verified network inventory, which is a comprehensive and accurate record of all the hardware, software, and other assets that make up a network. It's a critical foundation for effective network

management, security and planning. For both human experts and AI tools, a good inventory provides a single source of truth, eliminating the guesswork and potential for errors that come with manual, outdated records.

Why is inventory layer important for autonomous network architecture?

Autonomous networks (AN) rely on feedback loops (Sense - Analyze - Act), where Inventory layer provides these loops with crucial up-to-date information on every step.



Sense

Inventory Layer gives the AN system fault management component a picture of what can be monitored.



Analyze

In order to correlate alarms or find a root cause, the AN needs accurate information about alarm context, which is provided by the Inventory layer.



Act

Before a fault can be automatically remediated, the AN system needs to know what resources are available.

Becoming autonomous, using inventory

To become a Level 4 Autonomous Network, as defined by the TM Forum, it is necessary to have an accurate, real-time, versatile inventory.

A comprehensive inventory of assets, resources and services should track the complete life cycle of all assets related to the operation of a provider's network. Real time view enrichment from inventory will show cross-domain dependencies and help AI to make informed decisions.

Within TM Forum's DT4DI reference architecture, a unified inventory is key to providing the ability to perform Digital Twin Data Modelling. A digital twin is then used to automate a network because it provides a safe, accurate, and dynamic virtual replica of the physical network, which can be used as a testing ground and decision-making engine for automation. This allows telecom operators to move from reactive to proactive and ultimately autonomous network management.

Along with asset digital twins, inventory is needed for planning processes and strategic network planning processes. Having a single inventory catering to all processes, planning, provisioning and operations provides a single point of integration for the next major development of artificial intelligence, Agentic AI, which will be proactive and autonomous.



Telecom providers and network operators have struggled with the adoption of AI into network Ops due to siloed OSS architectures, redundant data and the absence of unified digital twin models.

Doing an inventory of all your company's assets is a lengthy and painstaking effort. But it is necessary to unleash all of the groundbreaking benefits of AI into a telecom's operations. By automating and enhancing various aspects of IT operations, the use of AI in OSS will transform IT from reactive problem-solving to proactive and even predictive management. There is no shortcut to taking your company's operations efficiency to the next level — increasing data accuracy by 95 percent, data efficiency by more than 80 percent and productivity by 83 percent.

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